## REMARKS

The present invention is concerned with preventing a fault in the switching means of a device from causing the transducers of the device from operating in a hazardous manner. Should a fault occur in the switching, the current necessary to energize the transducers may flow at an unintended time or an unintended direction leading unsafe operation. The goal is to stop the current before harm is done. Stopping the current only works to prevent harm if the device is designed so that the transducers are safe when off. Any device requiring transducer operation for safety is not covered.

In order to ensure that harmful operation is prevented there must be at least two switches in each circuit. There must be a functional switch to stop the current from flowing through a non-functional switch, therefore at least two switches are required. The control, using the sensing means to scan the transducer circuits, must be able to determine the state of independently operated switches. In prior art, as in the case in Schmidt sensing only determines the state of one switch per circuit. The method will not work as described if another switch is added, with the possible exception of two switches operated in unison (always in the same state).

I believe there are several reasons that the present method of scanning the transducer circuits rather sensing the output of transducer (heat, motion in Reck) has not been done before. First is the fact that in many cases transducers can not be simply turned off. To be safe we must ascertain whether the transducer is off when it should be and performing its function when it should be energized. Scanning the energizing circuit will not determine if the transducer is functioning in all cases.

The second reason is that on the surface it would appear that sensing transducer output is more thorough that transducer input. After all it is the output of the transducer that would cause the unsafe operation. However, it has been overlooked that by scanning transducer input we can find faults before the transducer is started and the instant that it should be off. This is important because failure is most likely when turning the circuits on/off. If a switch has failed at the last opening or anytime, the present control can prevent the transducer from being started. In prior approaches (scanning transducer output) the functionality of critical switches are only determined after the transducer has been started and if the last functioning switch fails when the transducer is turned on it can't be turn off. Further when the transducer is switched off one must wait for the sensing means to detect that the transducer is still on, by detecting a continued rise in temperature, motion etc.

Finally as mentioned, there is the difficulty of determining the states of independently operated switches in transducer circuits. Series circuits of switches in prior art generally rely on the fact that any one switch can open the circuit. Prior controls simply read whether or not the circuit is open or closed not the state of each switch. Safety has been made acceptable by the fact that multiple switches would have to short before a circuit would be erroneously closed.

The present solution to the safety issue allows both the control and an override to use the same switch, saving money, in the transducer circuits because the functionality of the switch is verified by the control. If the shared switch is non-functional the circuit will be opened by another switch in response to the control or the override, before the transducer can be mistakenly energized. Prior to this invention the override and the control would use separate unverified switches relying on the strength in numbers approach.

In regards to the rejections of claims 21,22,25,26,28, 30 the circuit opening system of Williams is not concerned with the currents of the present invention. Claims 21, 25, 32 have been amended to state that the current stopped by the functional switch is the current necessary to energize the transducers and that said current can be carried by the switches in the circuit. This is not the case with the switches in Williams, the circuit breaker opens when it and the other switches in the system can not carry the current. The Williams system does not care nor would it open if the energizing current were flowing when it was suppose to be off as this current is now defined in the claims as one that said switches can carry.

While not included in the embodiment any overload of the device would have to be handled by a circuit breaker, such as in Williams, or fuse whether in the device or between the device and the source of power. The sensing means of the present invention would not detect an overload and most probably would not function when one occurred, as the supply voltage of the control would not be maintained.

As mentioned the present system requires at least two switches in each transducer circuit. Both Schmidt and Wallaert have only one switch. There is no possibility that these approaches could use a functional switch to open a circuit containing a non-functional switch as there is only one switch. The present invention requires least two switches per transducer circuit in the present invention. Williams does have multiple switches in the transducers circuits, however the sectional switches can not be used to open the circuit, col5 ln38-40. Hence if the circuit breaker fails (becomes non functional) the sectional switches can not be used to open the circuit.

Next the transducers, brake lights in Schmidt, valves in the Wallaert are not safe when they are off. Simply turning off the brake lights or leaving a gear

box stuck in a particular gear is not safe. Therefore there is no reason to apply the approach of the present invention to either system.

Finally the detection system in Schmidt only covers a circuit with one switch per dc circuit. As described the detection system will not determine the states of two or more switches. Further one could not simply add a second to the circuit and expect the scanning method described to determine the state of both switches.

Claims 21, 26, 34, 37 have further been amended to state that switches are identified as functional switches or non-functional switches rather than being functional/ non-functional. Further that the current is prevented from flowing though said non-functional switch making it clear that no other method of determining switch functionality is claimed.

In regards to claims 22-24 granted there is prior art of switching similar transducers. One small point, Wallaert will not cause flooding rather the gears will not change.

In regards to the rejection of 31, the switches (50,52,54,56) are external, however they are in input circuits to the control, they are not in energizing circuits as claimed by the present invention. These circuits are designed as inputs to a control not to activate transducers by carrying high current.

Turning to the rejection of claim 32 based on Wohlfarth, Wohlfarth varies the on and off periods current is supplied to a transducer, however this is done to minimize the average amount of current flowing through the transducer while the transducer remains on. In the present invention the off periods are prolonged not to minimize the power required to keep the transducer energized but to extend the amount of time the transducer is off. The intent is to prevent a switch such as a lid switch on a washer from failing when the lid is opened and

closed repeatedly. The contacts of such a switch will heat up each time the lid is opened as the inductive load of the motor causes arcing. Normally this is no problem however if there is not sufficient time between openings the contacts may weld shut.

In regard to claim 36 and 39, in Figure 3 Wallaert each switch 1 scans one circuit. It is a little confusing as there are 5 switch 1s in the circuit, just as there are 4 loads 16. In Figure 5, 4 of the switch 1s do scan multiple circuits; however they are input circuits to the control reading the state of switches 19 whose intended state is unknown. Switches 19 are not intended to energize the loads 16 and are therefore not the energizing circuits of the present invention. The power to switches 19 is only on for 1ms which Wallaert describes as not being sufficient to change the state of transducers 16. This is how he reads the input switch 19 without affecting the status of the loads when their energizing switches 1 are turned off for 1ms to read the states of switches 19.

In regards to claim 38 Wallaert does not use overrides to open the transducer circuit. If you are calling switches 19 overrides they can only signal the control to open transducer circuits. An example of the difference is the start relay in the present invention. The low side current of the start relay passes through a low power lid switch (override) and a transistor of the control. If the lid is opened the start relay will turn off the motor regardless on the state of the control. Likewise, if the control turns off the transistor the motor stops regardless of the state of the lid switch.

With respect to claims 35 and 40 the switches cited in Reck are not in energizing circuits. Switches 50,52,54,56 are in circuits that are inputs to the control they do not directly turn on and off transducers.

In view of the amendments and these remarks, the applicant respectfully submits that the present application is in condition for allowance. A notice to that effect is earnestly and respectfully requested.

Respectfully submitted,

ALFRED W. MULDOON

Included are marked-up and clean versions of the amended claims for application 10/082,454 and a summary of the arguments made during the telephonic interview. Also included is this signed statement. I hereby declare that said substitute specification contains no new matter.

Alfred W. Muldoon 11-8-06

There are a total of 19 pages including this statement.

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